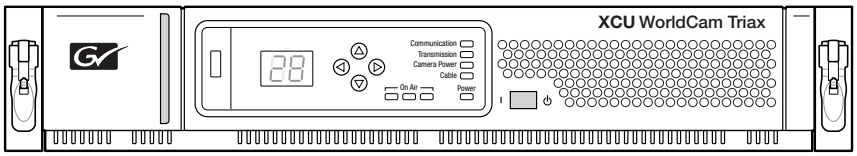
grass valley
A BELDEN BRAND

User's Guide

3922 496 32111 August 2014 v1.4



XCU

eXchangeable Control Unit

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www.grassvalley.com

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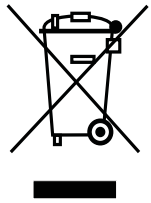
End-of-life product recycling



Grass Valley's innovation and excellence in product design also extends to the programs we've established to manage the recycling of our products. Grass Valley has developed a comprehensive end-of-life product take back program for recycle or disposal of end-of-life products. Our program meets the requirements of the European Union's WEEE Directive and in the United States from the Environmental Protection Agency, individual state or local agencies.

Grass Valley's end-of-life product take back program assures proper disposal by use of Best Available Technology. This program accepts any Grass Valley branded equipment. Upon request, a Certificate of Recycling or a Certificate of Destruction, depending on the ultimate disposition of the product, can be sent to the requester. Grass Valley will be responsible for all costs associated with recycling and disposal, including freight, however you are responsible for the removal of the equipment from your facility and packing the equipment ready for pickup.

For further information on the Grass Valley product take back system please contact Grass Valley at + 800 80 80 20 20 or +33 1 48 25 20 20 from most other countries. In the US and Canada please call 800-547-8949 or 530-478-4148. Ask to be connected to the EH&S Department. In addition, information concerning Grass Valley's environmental policy can be found at:

www.grassvalley.com/about/environmental-policy

Packing/unpacking

Inspect the shipping container for evidence of damage immediately after receipt. If the shipping container or cushioning material is damaged, it should be kept until the contents of the shipment have been checked for completeness and the units have been checked mechanically and electrically. The shipping container should be placed upright and opened from the top. Remove the cushioning material and lift out the contents. The contents of the shipment should be checked against the packing list. If the contents are incomplete, if there is mechanical damage or defect, or if the units do not perform correctly when unpacked, notify your sales or service centre within eight days. If the shipping container shows signs of damage or stress, notify the carrier as well.

If a unit is being returned to for servicing, try to use the containers and materials of the original packaging. Attach a tag indicating the type of service required, return address, model number, full serial number and the return number which will be supplied by your service centre. If the original packing can no longer be used, the following general instructions should be used for repacking with commercially available materials:

1. Wrap unit in heavy paper or plastic.
2. Use strong shipping container.
3. Use a layer of shock-absorbing material around all sides of the unit to provide firm cushioning and prevent movement inside container.
4. Seal shipping container securely.
5. Mark shipping container FRAGILE to ensure careful handling.

Declaration of conformity

We, Grass Valley Nederland B.V., Kapittelweg 10, 4827 HG Breda, The Netherlands, declare under our sole responsibility that this product is in compliance with the following standards:

- EN60065 Safety
- EN55103-1:2009 EMC (Emission) for the following environments:

  (E1) Residential;

  (E2) Commercial and light industrial;

  (E3) Urban outdoors;

  (E4) Controlled EMC environment, and the rural outdoors environment.
- The average half-cycle r.m.s. inrush currents for this product are:

  - 16 A (on intial switch-on);

  - 11 A (after a supply interruption of 5 s).
- EN55103-2 EMC (Immunity)

following the provisions of:

- the EMC Directive 2004/108/EC
- the Low Voltage Directive 2006/95/EC

FCC Class A Statement

This product generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instructions, may cause interference to radio communications.

It has been tested and found to comply with the limits for a class A digital device pursuant to part 15 of the FCC rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment.

Operation of this product in a residential area is likely to cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

Important information

Read these instructions carefully and retain them for future reference.

During installation and operation of this equipment, local building safety and fire protection standards must be observed.

Whenever it is likely that safe operation is impaired, the apparatus must be made inoperative and secured against any unintended operation. The appropriate servicing authority must then be informed. For example, safety is likely to be impaired if the apparatus fails to perform the intended function or shows visible damage.

Any changes or modifications not expressly approved in this manual could void your authority to operate this equipment.

Cautions and Warnings

Read and comply with the warning and caution notices that appear in the manual.

- Warnings indicate danger that requires correct procedures or practices to prevent death or injury to personnel.
- Cautions indicate procedures or practices that should be followed to prevent damage or destruction to equipment or property.

Warnings

To prevent fire or shock hazard, do not expose the unit to rain or moisture.

To avoid electrical shock, do not remove covers or panels. Refer servicing to qualified personnel only.

In case of an emergency ensure that power is disconnected.

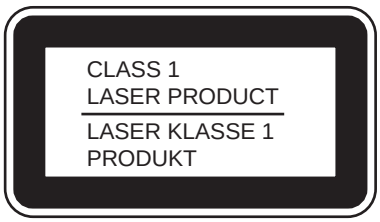
Use only fuses of the type and rating specified.

Connect the unit only to a power source with the specified voltage rating.

To prevent risk of overheating, ventilate the unit correctly.

For safety reasons the unit must be mounted in a 19-inch rack which has safety covers according to IEC65.

Fiber-optic transmission units



Laser safety statement (Europe)

Fiber-optic transmission units are classified as a "CLASS 1 Laser Product" according to EN 60825-1, Safety of Laser products. Class 1 laser products are considered safe and do not result in biological hazard if used according to the instructions.

Laser safety statement (US)

Fiber-optic transmission units are classified as a "CLASS 1 Laser Product" according to 21CFR 1040.10 of the US Food and Drug Administration (FDA) Center for Devices and Radiological Health.

Use of controls, adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

To ensure proper use of this product, please read this instruction manual carefully and retain for future reference. Should the unit ever require maintenance, contact an authorized service location.

Fiber-optic cable precautions

Fiber-optic cables and connectors are easily damaged; take the following percautions into account:

- Do not bend the cable beyond the minimum permissible bend range specified for the cable.
- Avoid kinks in the cable.
- Avoid subjecting the cable to a high tension force (even momentarily).
- Do not twist the cable when connecting it to equipment.
- Insert connectors straight and fully into their corresponding sockets.
- In fiber-optic cable systems always put the dust caps on cable and panel connectors immediately after disconnecting a cable. Keep the dust caps clean.

Cleaning fiber-optic connectors

WARNING

Never clean an optical connector attached to a fiber that is carrying light.

Particles of foreign matter on the tip of a ferrule can have a disabling effect on fiber-optic transmission. Fiber-optic connectors need to be cleaned every time they are mated and unmated; it is essential that fiber-optic users develop the necessary discipline to always clean the connectors before they are mated.

Use a commerially available cleaning kit specifically designed for fiber-optic connectors and follow the manufacturer's instructions carefully.

- The connector sections to be cleaned include the tips and sides of ferrules, the interior walls of alignment sleeves, and the interior and exterior of connector shells.
- For plugs, the interior surfaces of alignment sleeves and the tips of ferrules are to be cleaned with a cleaning stick treated with the appropriate fluid. (Cleaning sticks with a slender design are available that allow alignment sleeves to be cleaned without having to detach them.)
- For jacks, it is important to clean both the tips and sides of the completely protruding ferrules.
- Both the male and female connector shells tend to attract dust and metal particles, so it is important to clean both the insides and outsides.
- The fiber end face and ferrule must be absolutely clean before it is inserted into a transmitter or receiver.
- Mate the connector immediately! Do not let the connector lie around and collect dust before mating.
- Air can be used to remove lint or loose dust from the port of a transmitter or receiver to be mated with the connector. Never insert any liquid into the ports.

Mains lead wiring for UK users

The wires in the mains lead are colored in accordance with the following code:

GREEN and YELLOW- EARTH

BLUE- NEUTRAL

BROWN- LIVE

As the colors of the wires in the mains lead of this apparatus may not correspond with the colored markings identifying the terminals in your plug proceed as follows:

- The wire colored GREEN AND YELLOW must be connected to the terminal on the plug marked with the letter E or by the safety earth symbol ⏚ or colored GREEN or GREEN AND YELLOW.
- The wire colored BROWN must be connected to the terminal marked with the letter L or colored RED.
- The wire colored BLUE must be connected to the terminal marked with the letter N or colored BLACK.

Ensure that your equipment is connected correctly - if you are in any doubt consult a qualified electrician.

Chapter 1

Introduction

1.1 Welcome

Grass Valley's XCU (eXchangeable Control Unit) is a heavy duty, multi-standard transmission and power system designed for Grass Valley studio cameras.

1.1.1 About this manual

The purpose of this manual is to present a detailed description of how to install and operate the XCU . It provides the information necessary to install, set up and operate the unit in different configurations.

1.1.2 Related documents

Before proceeding, check the Grass valley website at www.grassvalley.com for the latest version of this user's guide and additional information:

- Online versions of documentation; updated versions of user's guides, data sheets, brochures, application notes in pdf-format are available for download.
- Software downloads; camera software updates, release notes and installation instructions are available for download.

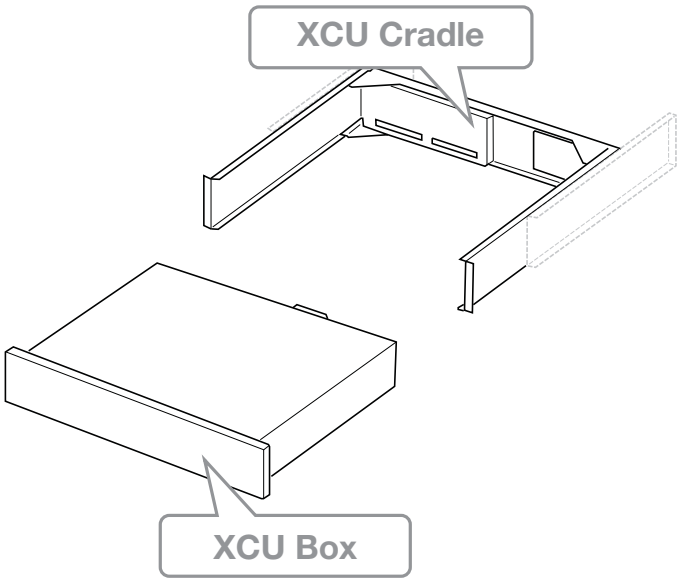
1.2 Technology

1.2.1 Unique Cradle concept

The eXchangeable Control Unit system is like no other in the world. Its unique cradle can be pre-mounted and pre-wired in a 19-inch rack, making a secure mechanical and electrical connection, permitting the XCU box to easily slide in and out whenever needed. Each XCU comes with one cradle, but additional cradles may be acquired to extend usability across different environments, allowing you to quickly and easily transfer XCUs between OB vans, studios, or anyplace.

The cradle concept allows for moving boxes easily and quickly between locations such as trucks and studios. Pre-mounted and pre-wired to eliminate cabling errors, the unique cradle provides on-demand resources for fast paced productions, resulting in less set up time and more on-air time. Compatibility with the LDX Series and many LDK Series cameras extends the cradle's usefulness across all types of productions.

Triax and/or Fiber connectors can easily be exchanged during production and in the field. All other connectors are mounted on a separate connector panel in the cradle. After disconnecting mains power and the Triax/Fiber transmission the box can be removed.



1.2.2 3G Transmission

Grass Valley's latest XCU is based on full digital transmission and a proven and robust power system. The 3G transmission system consists of a dockable camera adapter that fits on Grass Valley HD camera heads and an XCU that takes care of power, signal transport and conversion and connection to the studio or OB van.

A wide range of 3G transmission versions is available, so there is always an option that suits your operational situation best.

XCU 3G Triax

The XCU 3G Triax makes camera transmission fully compatible with industry standard Triax cables. This allows the use of existing, reliable and valuable cable inventories and at the same time increases already long cable runs with up to 25% greater distances.

3G Triax offers video transmission and remote control of cameras up to a distance of 1,500 m (5,000 ft) and beyond, using standard 14 mm (0.55 in.) Triax cables.

XCU 3G Fiber

The XCU 3G Fiber is equipped with a hybrid fiber connector.

3G Fiber offers video transmission and remote control of cameras up to a distance of 3,000 m (10,000 ft) and beyond, using hybrid fiber cables.

XCU 3G Dual

The XCU 3G Dual combines a Triax connector with a hybrid fiber connector.

XCU 3G Twin

The XCU 3G Twin combines a Triax connector with two dark fiber connectors.

1.2.3 XCU models

There are two XCU models available:

Elite

This model supports 720p/1080i/1080PsF video modes and offers 8x 1.5 Gbit/s HD-SDI video outputs.

Connect LDX Series, LDK 8000, LDK 8000 Elite and LDK 8300 (single speed only) cameras to this XCU model.

WorldCam

This model supports 720p/1080i/1080p/1080PsF video modes and offers 6x 3 Gbit/s, 2x 1.5 Gbit/s or 8x 1.5 Gbit/s HD-SDI video outputs.

1.2.4 Camera control and monitoring

You can access the XCU menu, which contains all operational settings, from an Operational Control Panel. In addition to the operational menu, the installation and service menus can be accessed directly from the XCU. The XCU is compatible with all existing control system components.

An OCP 400 operational control panel can be connected directly to the XCU using a cross-over Ethernet cable. Full camera control is provided via a C2IP Ethernet-based control network.

The communication facilities provide for two-wire or four-wire high quality intercom signals.

Transmission quality can be continuously monitored before and during operation from the OCP 400 operational control panel and/or the LDK Connect Gateway.

1.3 Main features

- Flexible and multiple audio and video connectivity.
- Unique cradle mounting concept ensures maximum flexibility at a minimum set-up time.
- Many different video transmission systems are available.
- Reliable video transmission of many video formats:
  - 1080p50 and 1080p59.94 (XCU WorldCam versions only)
  - 1080i50 and 1080i/59.94
  - 720p50 and 720p59.94
  - and many psf HD video formats.
- Transports the following digital signals from camera to XCU: main video signal, four audio channels (including embedded digital audio), two intercom channels, control and private data.
- Transports the following digital signals from XCU to camera: power, three external HD video inputs, teleprompter signal, three intercom channels, control and private data.
- Full camera control via Grass Valley's C2IP Ethernet-based control network.
- Three channel (two-wire or four-wire) intercom system compatible with international standards.
- Built in a compact 2U high, 19-inch rack housing.
- Teleprompter, color bar, HD-SDI outputs standard on board.
- The digital transmission backbone and power module meet the most demanding broadcasting needs.
- Heavy-duty design with a new reliable power unit with low power consumption, ideal for outside broadcast vans.
- HD and simultaneous high-quality SD outputs available.

Chapter 2

Installation

2.1 Rack installation

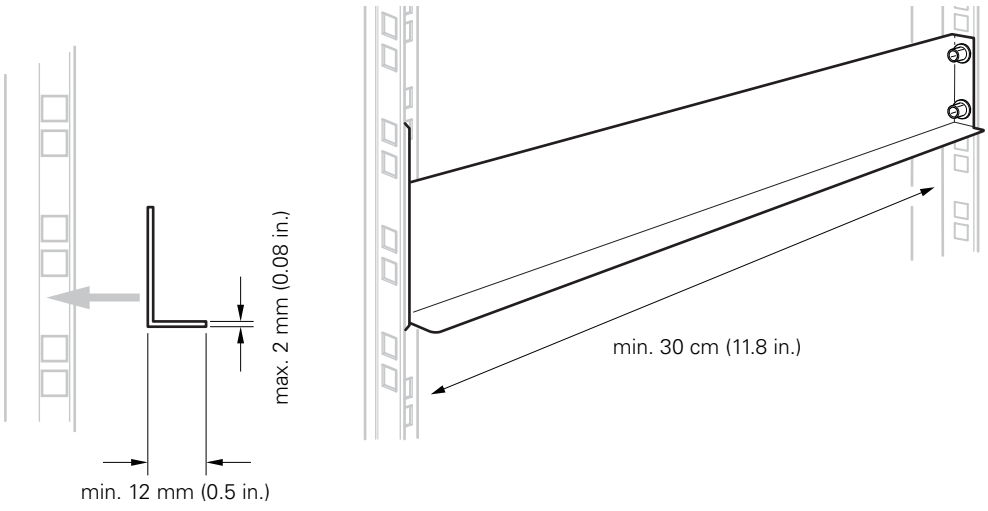
2.1.1 Installing rack mounting rails

The XCU Cradle can be mounted in most standard 19-inch video or IT rack types. The unit needs two rack units (2 RU) of vertical space in the rack.

Install two L-shaped rack mounting rails (not supplied) that match your rack type. Refer to the documentation of your mounting rails or rack for installation instructions.

- Make sure that both front and back end of the rails are attached to the rack. Allow a minimum distance of 30 cm (11.8 in.) between the secured points.
- There should be a blind/untapped area in the front of the vertical rack beam where the locking mechanism of the XCU engages the rack.
- The thickness of the horizontal leg of the L-shaped mounting rails must not exceed 2 mm (0.08 in.) in order to leave enough space for more cradles to be mounted below the unit.

Below is an example of a rack mounting rail installed in a 19-inch rack. Note that your specific situation may be different.



2.1.2 Installing the cradle

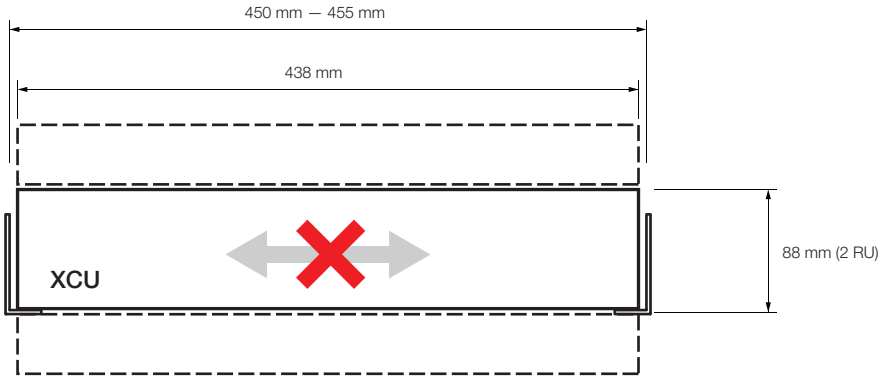
After mounting the rack mounting rails, install the cradle:

1. Slide the cradle into the rack so it is supported by the L-shaped mounting rails.
2. Fix the cradle to the front rack posts using four M6-screws (not supplied with the unit).

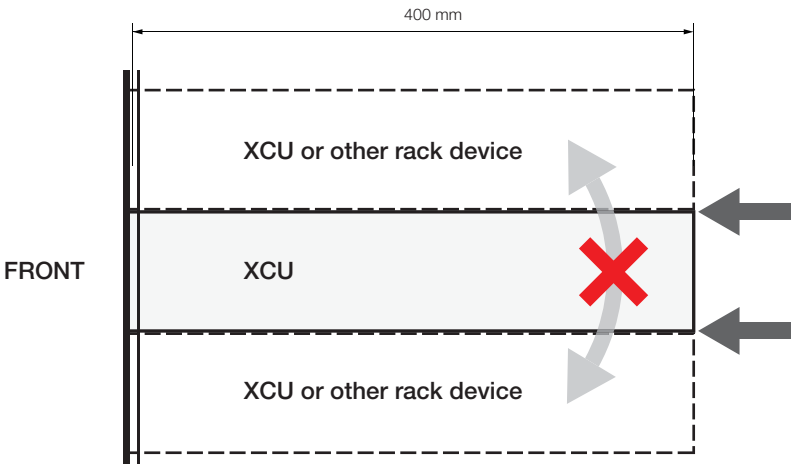
2.1.3 Transporting rack mounted XCUs

When transporting rack mounted XCUs in a flightcase make sure to take the following precautions:

- Use proper shock absorbers for the rack to prevent damage during transport.
- To prevent any horizontal movement of the cradle and XCU during transport, make sure there is as little horizontal clearance as possible between the cradle and the mounting rails:



- To prevent any vertical movement of the cradle during transport, lock up the cradle between other units and the vertical rail stands as indicated in the illustration below. Make sure there is enough support at the back of the unit, at a minimum distance of 400 mm from the rack front/



2.1.4 Connecting studio cabling

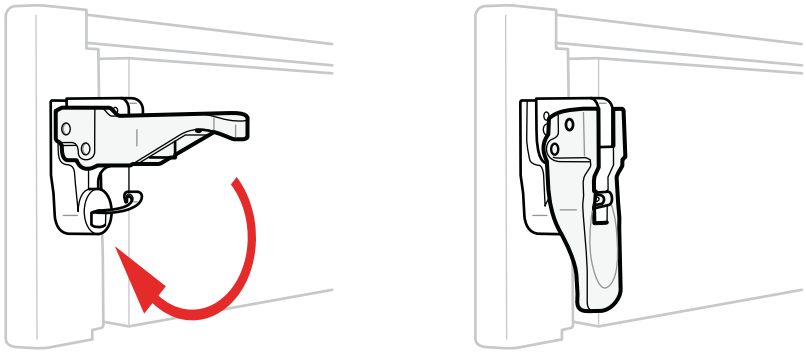
The studio cabling (main video outputs, control and intercom connections, studio signalling) can now be connected according to your application and studio configuration. Refer to "Cradle back panel" on page 50 for connectors and signals available on the cradle.

More information about studio signalling, control network, intercom cabling and other studio infrastructure can be found further down this chapter.

2.2 Mounting the XCU

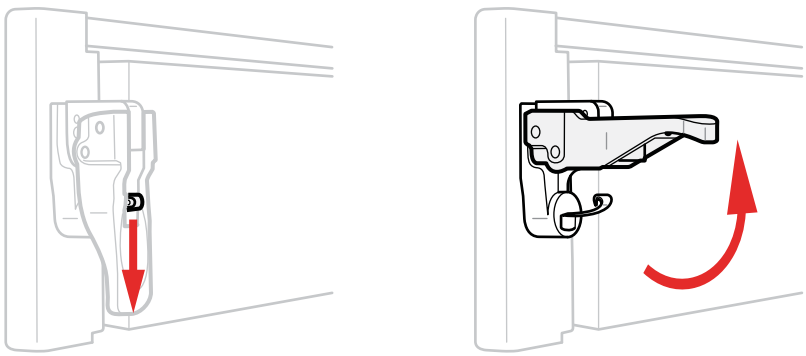
To mount the XCU into the cradle, proceed as follows:

- Place the XCU onto the sliding rails of the cradle, slide the unit into the cradle and push firmly.
- Push down the right and left locking handles until they snap down.



To remove the XCU from the cradle, proceed as follows:

- Hold down the springs inside the locking handles and at the same time swing them open.
- Pull out the XCU from the cradle by pulling the XCU at its sides.



- Now the transmission and mains cables can be connected. Refer to "XCU back panel" on page 49 for connectors and signals available on the XCU.

2.3 Setting up the control network

The XCU is connected to the control network hub or router via an Ethernet cable (straight-through, not cross-over). An OCP 400 (Operational Control Panel) and, if required an MCP 400 (Master Control Panel), are also connected to the Ethernet network via a hub or router. An OCP 400 can also be connected directly to the XCU using a cross-over Ethernet cable.

The IP address and other options for the Ethernet connection can be set up in the XCU menu. These items can also be set up remotely using a network configuration tool such as Grass Valley's SiteConfig software.

Note

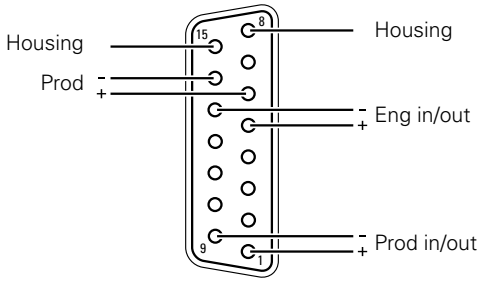
By default, the Ethernet connection is set up for automatic IP configuration.

2.4 Setting up intercom

Connect the studio intercom system to the rear of the XCU. Both a two and four-wire cabling can be used. In the `AUDIO/INTERCOM` > `INTERCOM` > `ENG` > `WIRE MODE` menu select the cabling system: 2wire or 4wire.

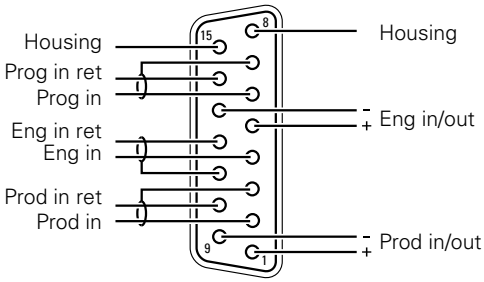
The wiring of the panel connector is shown below for two-wire and four-wire systems.

Two-wire systems



Signal	Value
Signal level	0 dBu (RMS)
Load impedance	200 Ω
Voltage level	max. 40 VDC

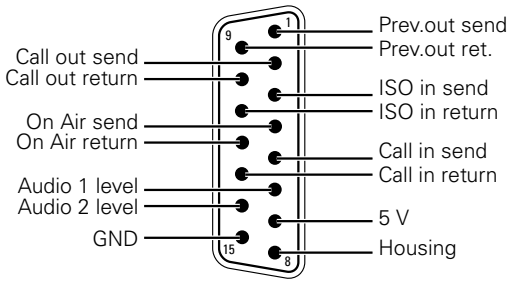
Four-wire systems



Signal	Value
Output signal level	+6 or 0 dBu (RMS) selectable
Output impedance	max. 50 Ω symmetrical
Input signal level	+6 or 0 dBu (RMS) selectable
Impedance	min. 9 kΩ symmetrical

2.5 Setting up studio signalling

Connect the studio signalling system to the rear of the XCU. The wiring of the signalling connector is shown below:

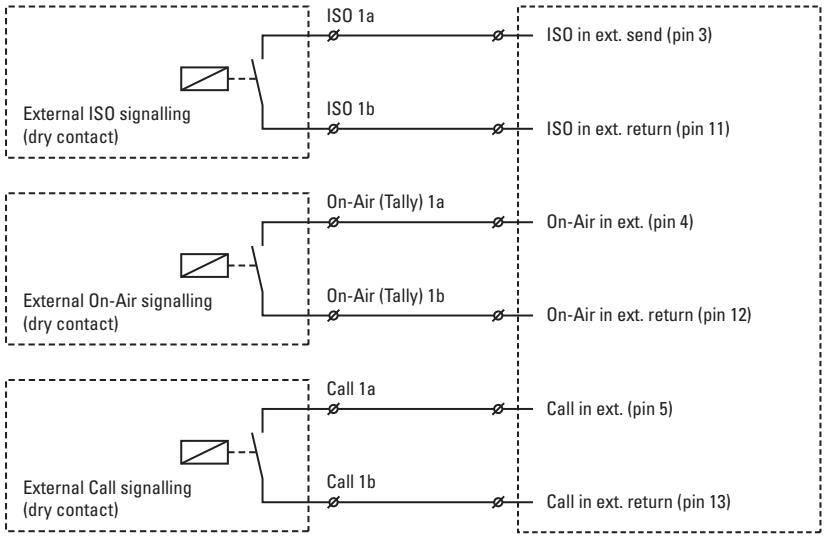


Signal	Send pin	Return pin
ISO	3	11
On Air	4	12
Call	2	10

There are several connection methods for the ISO (On Air Yellow), On Air and Call signalling functions: **dry contact**, **common ground**, **voltage level** and **open circuit/voltage level.**

A selection in the `INSTALL` > `SIGNALLING INPUT` menu allows you to make the activity state of the function (Active or Inactive) correspond to a particular input signal. There are two leads for each connection - Send and Return.

2.5.1 Dry contact



☞ Note

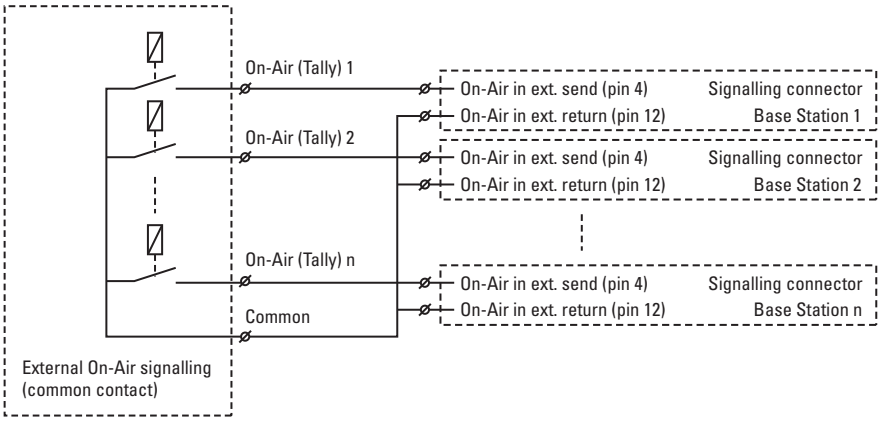
A common return (not ground!) can be used for all three functions (ISO, On Air and Call)

If a contact is closed, the corresponding function is Active or Inactive, depending on the selection in the `INSTALL` > `SIGNALLING INPUT` menu:

Menu setting	Input is shorted:	Input is open:
LH (low-high)	Function is Active	Function is Inactive
HL (high-low)	Function is Inactive	Function is Active

2.5.2 Dry contact with multiple XCUs

This is an example of an On Air signalling with multiple XCUs using a common contact.



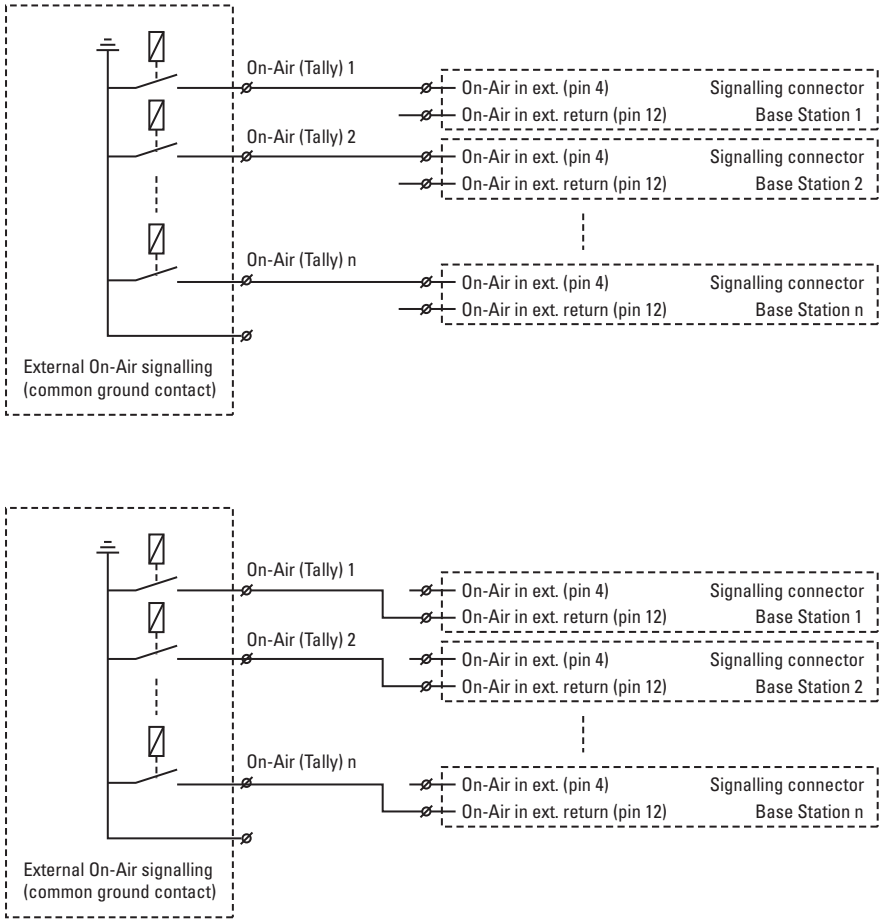
☞ Note

Use either Send or Return only, but do not mix.

If a contact is closed, the corresponding function is Active or Inactive, depending on the selection in the `INSTALL` > `SIGNALLING INPUT` menu:

Menu setting	Input is shorted:	Input is open:
LH (low-high)	Function is Active	Function is Inactive
HL (high-low)	Function is Inactive	Function is Active

2.5.3 Common ground



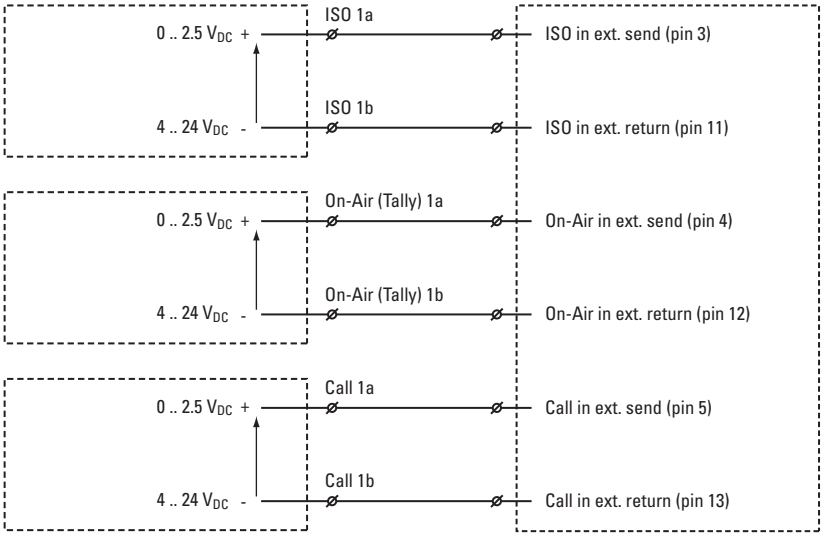
☞ Note

Ensure that a reliable ground coupling exists between the control device ground and the XCU ground.

If a contact is closed, the corresponding function is Active or Inactive, depending on the selection in the `INSTALL` > `SIGNALLING INPUT` menu:

Menu setting	Input is shorted:	Input is open:
LH (low-high)	Function is Active	Function is Inactive
HL (high-low)	Function is Inactive	Function is Active

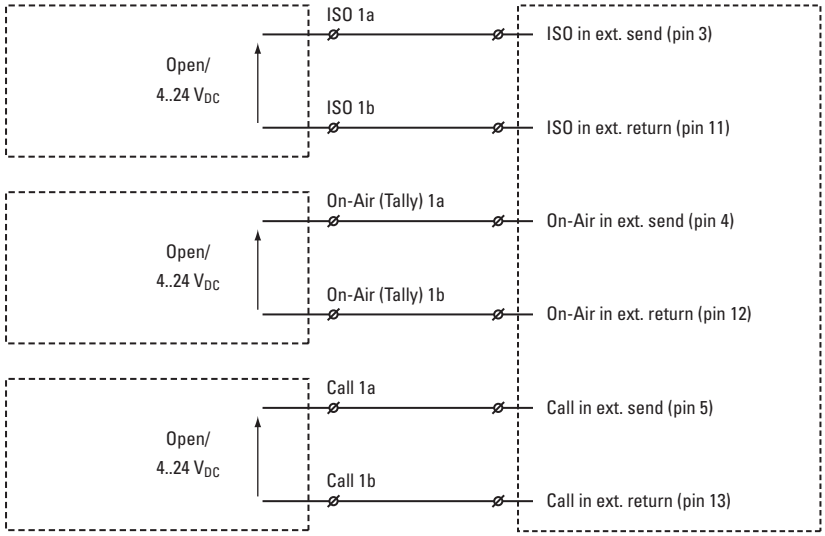
2.5.4 Voltage level


ISO 1a
0 .. 2.5 VDC +
ISO in ext. send (pin 3)
ISO 1b
4 .. 24 VDC -
ISO in ext. return (pin 11)
On-Air (Tally) 1a
0 .. 2.5 VDC +
On-Air in ext. send (pin 4)
On-Air (Tally) 1b
4 .. 24 VDC -
On-Air in ext. return (pin 12)
Call 1a
0 .. 2.5 VDC +
Call in ext. send (pin 5)
Call 1b
4 .. 24 VDC -
Call in ext. return (pin 13)

Apply a DC voltage to the inputs (respect polarity). If the voltage is low (0 to 2.5 V), the function is Active (or Inactive). If the voltage is high (4 to 24 V) the function is Inactive (or Active). The function state depends on the selection in the `INSTALL` > `SIGNALLING INPUT` menu:

Menu setting	Input is 0 to 2.5V:	Input is 4 to 24V:
LH (low-high)	Function is Active	Function is Inactive
HL (high-low)	Function is Inactive	Function is Active

2.5.5 Open circuit/Voltage level



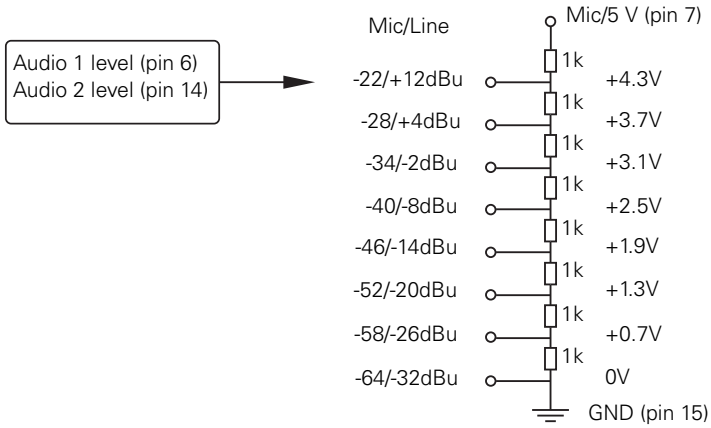
Leave the circuit open or apply a DC voltage to the inputs (respect polarity). If the circuit is open, the function is Active (or Inactive). If the voltage is high (4 to 24 V) the function is Inactive (or Active).
The function state depends on the selection in the `INSTALL` > `SIGNALLING` `INPUT` menu:

Menu setting	Input is open:	Input is 4 to 24V:
OH (open-high)	Function is Active	Function is Inactive
HO (high-open)	Function is Inactive	Function is Active

2.6 Setting up external audio level

The camera audio levels for channel 1 and 2 can be externally controlled by the XCU. In the camera system menu, go to the INSTALL > AUDIO > AUDIO GAIN MODE item and select Ext.

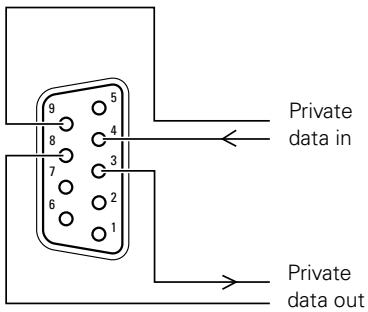
On the OCP 400, push the SETUP button and choose the Cam submenu. Use the NEXT button to scroll to the REM AUDIO menu and select Rem. Apply a DC voltage to pins 6 and 14 of the signalling connector to control the levels of audio channels 1 and 2 respectively, as shown in the figure below:



The actual audio level depends on the setting of the switches at the back panel of the camera adapter. When Mic is selected, the max. gain level is -64 dBu, while max. line level is -32 dBu.

2.7 Using private data

Private data channels can be used for sending serial data via the transmission cable. For example, electronic scriptboard or character data for a video display unit or pan and tilt data can be transmitted to the camera.



Function	Value
Bitrate	max. 100 kbit/s
Output level (high)	> 4 V
Output level (low)	< 4 V
Output impedance	250 Ω
Input level (high)	> 2 V (max. 12 V)
Input level (low)	< 2 V
Input impedance	> 4.7 kΩ

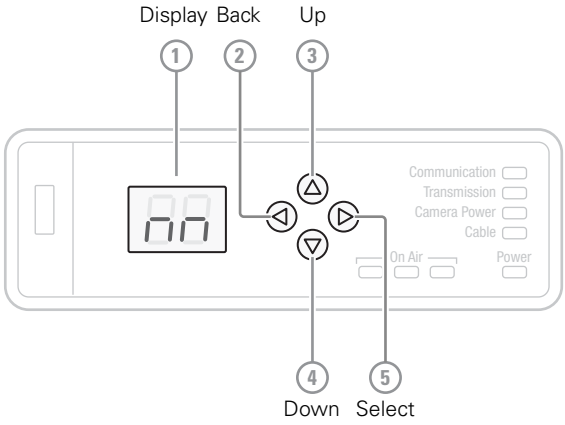
☞ Note

Propagation-delay times vary with cable length, especially if a return signal is involved. At max.lengths the total delay is at least 25 µs and can be more than 30 µs depending on the type of cable. The duty cycle difference between input and output is max. 5%.

Chapter 3

Setup

3.1 Front navigation panel



The front navigation panel is used to set the camera number and to access and navigate the internal XCU menu.

3.2 Setting the camera number

Hold the Select button [5] until the camera number on the display [1] starts flashing. Now use the Up [3] and Down [4] buttons to select the camera number. Push Select again to confirm the settings or push Back [2] to undo the selection.

3.3 Accessing the menu

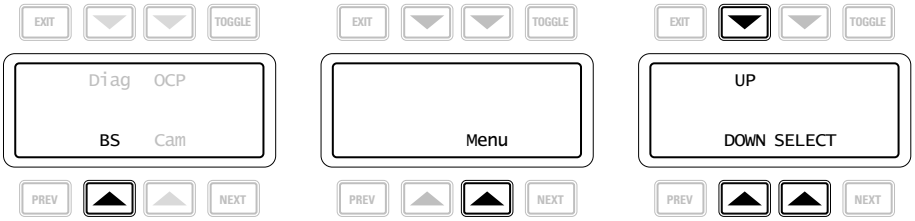
3.3.1 Using the XCU front navigation panel

To access the internal XCU menu, push the Select [5] button. The display [1] shows "nn".

3.3.2 Using the OCP 400 operation control panel

The OCP 400 can be used to access the XCU menu remotely:

1. Push the SETUP button on the OCP 400 to open the setup menu.
2. Push the Selection button to choose the BS menu.



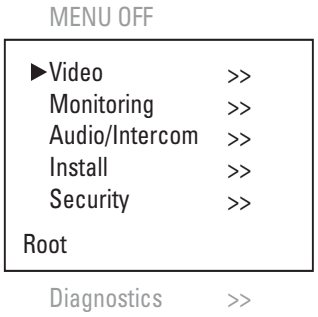
3. Push the Selection button enter the menu,.
4. The menu appears on the Monitoring outputs of the XCU. Use the appropriate selection buttons to navigate the menu. You can also use the rotary contol on the OCP 400 to move up or down through the menu.

3.4 Navigating the menu

The XCU menu is used for configuring the unit. As there are a large number of functions and set-up options available, it may require some time to become familiar with them all. The menu is available on the Monitoring outputs.

3.4.1 Entering the menu

Use the navigation panel on the XCU or the OCP 400 to access the menu. The functions of the XCU are grouped into menus and sub-menus. When accessed, the main menu appears on the monitor outputs:



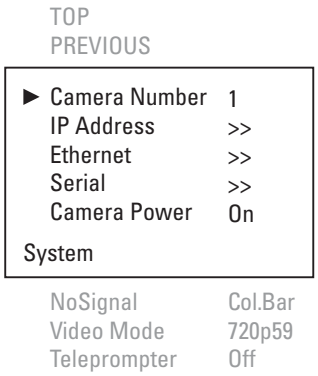
The main menu screen shows five items and the name of the menu (at the bottom). One or more item can be hidden but become visible when you scroll down. A cursor shows your position in the menu. Use the Up and Down buttons to move the cursor up and down.

3.4.2 Finding your way

Use the navigation buttons to move the cursor through the menu items. If a double arrow (>>) is visible, then pressing the Select button brings you one level lower in the menu system. Only five items are visible in each menu. Scroll up or down to see more items.

When you first enter a menu (other than the main menu) the cursor is positioned next to the first item. The TOP and PREVIOUS entries are not immediately visible but are located above the first item. Use the control to scroll up to them.

- Select TOP to bring you back to the Main menu.
- Select PREVIOUS to go back to the menu that you were in before the current one.



The System menu above shows the items displayed when you first enter the menu and the other items that are available by scrolling up or down.

3.4.3 Leaving the menu

If you are deep within the menu structure, follow these steps to leave:

- If necessary move the cursor to the left column.
- Scroll upwards until the cursor points to TOP (this is the main menu).
- Press the Select button; the cursor now points to the Menu Off item of the Main menu.
- Press the Select button to leave the menu.

This is the recommended way of leaving the system menu. The menu system disappears after a few seconds when you stop navigating. This delay can be set in the `MONITORING` > `MENU`.

However, when you enter the menu again you enter at the last position of the cursor and not at the top of main menu. To prevent confusion the next time you enter the system menu, it is advisable to leave the system menu by returning to the main menu (TOP) and selecting MENU OFF.

3.4.4 Making changes

To find out where to change a function, consult "XCU menu reference" on page 37 to find out under which menu group or subgroup the function is located. If the cursor points to an item (and there are no double arrows to indicate a sub-menu) then the item pointed to has a value. The value can be:

- a toggle value (only two values, for example Yes or No)
- a list value (more than two values)
- an analog value (variable from 00 to 99)
- or unavailable (---).

If the value is unavailable it cannot be changed. This is indicated by three dashes (---). This can occur, for example, when a function is switched off. The analog values associated with that function are then unavailable. If there are only two values associated with the function, then pressing the Select button toggles between these two values. If a value is displayed next to a function that is one of several possible values, then pressing the Select button places the cursor in a list menu indicating the value currently selected. Use the Up and Down buttons to point to a new value. Press the Select button to return the cursor to the function list. If an analog value is displayed next to a function name, pressing the Select button places the cursor in front of the value and the navigation control is used to change the analog value. Press the Select button to return the cursor to the function list.

Using Recall File to undo changes

If you make changes to the settings in the menu and you decide not to keep them, use the Recall File function to recall a standard or stored set of values for the parameters. These files are available in the Files menu.

3.4.5 User levels

There are four user levels: user 0, user 1, user 2 and user 3. The purpose of the user levels is to restrict the set of functions which can be changed by whoever is operating the unit. User level 0 is a special protection level which locks most of the operational controls of the camera. Use this level to ensure that a camera that has been set-up is not tampered with. User level 0 is not normally used for operational purposes as it is too restrictive for normal circumstances. The recommended minimum user level is 1. For full control set the level to 3. When you switch off the power, the access rights that were obtained by the use of the PIN code are disabled and the camera starts at the assigned user level when switched on again.

3.5 Intercom setup

The studio camera systems offer extensive intercom facilities between cameraman, tracker (floor man), XCU and studio. To help you set up and operate the intercom system, the following controls are available:

- XCU menu system
- Camera head menu system
- Camera adapter rear panel
- Camera head switches

Tip

When setting up a system it is usually more convenient to use an OCP 400 to set your preferences in both the XCU and camera head menus.

3.5.1 Studio interface setup

A four-wire or a two-wire studio system can be connected to the XCU. In the `AUDIO` > `INTERCOM` menu, select the Wire Mode for the engineering (ENG), production (PROD) and program (PROG) channels. By default these values are set to four-wire.

Isolate

The isolate function completely disconnects the XCU intercom from the studio system. The function can be switched locally or remotely via the OCP 400.

Levels

In the four-wire mode the menu gives you a choice of either a 0 dBu or a +6 dBu signal level. In the two-wire mode this level is set to 0 dBu.

- Set the input and output intercom levels for the PROD and ENG channels. The range is 0 to 99; default is 50.
- Set the input level for the PROG channel.
- Set the levels for the sidetone in a two-wire system in this menu.

3.6 Color bars

For set up and test purposes, the XCU can generate a color bar signal at the HD-SDI output connectors. This signal will be only present when no camera is connected and no valid video signal is received.

- To turn on the XCU color bar, go to the VIDEO > COLOR BAR > COLOR BAR item and select On.
- The color bar type can be selected with the VIDEO > COLOR BAR > COLOR BAR TYPE item. Two color bar types are available: Split (default) and Full.

3.7 Timing

All main HD Video, SD and monitoring output signals coming from the XCU are in phase. Still, due to different cable lenghts or other delays, the signals from different XCUs can be out of phase when they are connected to a video switcher or router.

This variation in phase can be compensated for in the XCU by using horizontal phase (H-phase) adjustment. Go the INSTALL > TIMING menu and adjust the H-PHASE item.

☞ Note

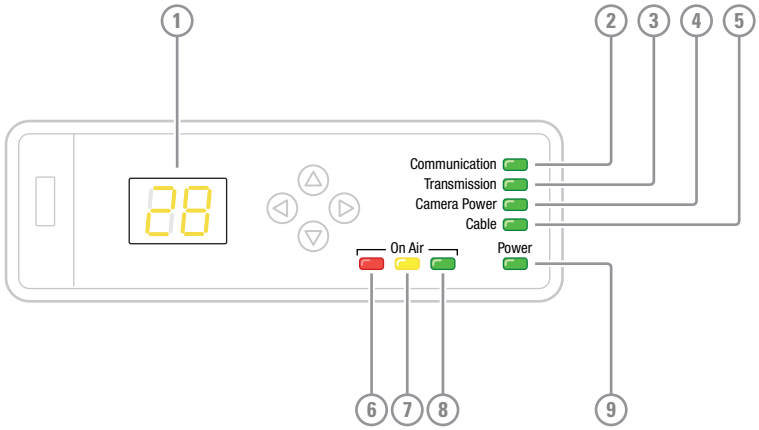
The phase shift can be further adjusted in the INSTALL > TIMING > SHIFT menu. Use the PIXELS and LINES items to shift the signals over one or more pixels and one or more lines, respecively. The maximum shift is exactly one frame.

Chapter 4

Operation

4.1 Front panel indicators

During setup and operation, transmission can be monitored on the XCU front panel. A display and several LED indicators provide information about important operational functions.



① Camera number display

In normal operation the segment display shows the camera number of the camera connected to the XCU. When the internal menu is accessed, the display shows "nn".

② Communication indicator

This green indicator lights when communication between camera and the XCU is established and working correctly. A red indicator indicates a communication error.

③ Transmission indicator

This green indicator lights when a working signal transmission is established between the camera and XCU. In case of a Triax connection, this indicator lights green. A correct Fiber connection is indicated by a blue light. A red light indicates a connection error.

④ Camera Power indicator

A green light means that the connected camera is powered by the XCU and switched on. A blinking green light indicates that a camera is connected but not switched on. A red light indicates a power supply error (e.g. a power overload).

⑤ Cable indicator

This green indicator lights when a transmission cable is correctly connected between the camera and XCU. A blinking red light indicates a missing or interrupted transmission cable. A red light indicates that a cable is connected but there is an error (e.g. a short circuit).

⑥ On Air indicator

The On Air indicator lights when the connected camera is switched On Air.

⑦ On Air Yellow indicator (or ISO)

The On Air Yellow indicator lights when the connected camera is switched to On Air Yellow or when the camera is in ISO mode.

⑧ On Air Green indicator (or Call)

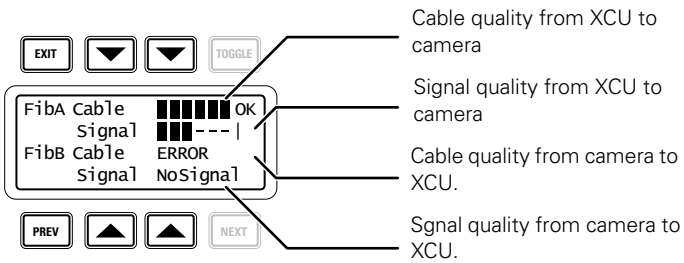
The On Air Green indicator lights when the connected camera is switched to On Air Green or when a Call signal is sent or received.

⑨ Power indicator

This green indicator lights when the XCU is switched on. A blinking green indicator means that the unit is shutting down.

4.2 Transmission diagnostics on the OCP 400

With an Operational Control Panel (OCP 400) is connected to the system, transmission can be monitored in the diagnostics page of the panel:



Indication	Description
▮▮▮▮▮ OK	Cable or signal quality is OK.
▮▮▮--- |	Cable or signal quality is below optimum, transmission is still in operation. The quality level can vary between 6 (high) and 0 (low) units.

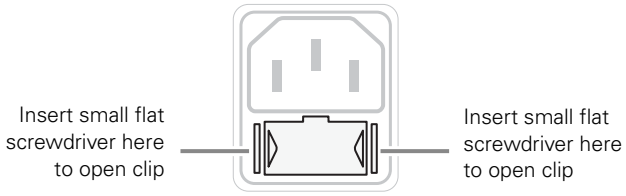
Indication	Description
------ |	Cable or signal quality is poor. Check cable and connectors for interruptions, broken or dirty optical connections.
ERROR	Cable error. Check cable and connectors for interruptions, broken or dirty optical connections.
NoSignal	No signal is received. Check cable and connectors for interruptions, broken or dirty optical connections.

4.3 Replacement of fuses

Caution
Switch off the XCU and disconnect power cables before proceeding.

Use only fuses of the type and rating specified. Always replace both fuses at the same time.

The XCU is equipped with 2x T8AH type 250 V fuses . They are located in the mains entry at the back of the unit. Follow these steps to replace the fuses located in the mains entry:



1. Insert a very small screwdriver into the hole at the left side and then at the right side of the fuseholder to unclip both side of the fuseholder.
2. Extract the fuseholder from the mains entry by pulling of the small clip at the bottom of the fuseholder.
3. Replace both fuses.
4. Insert the fuseholder until it clicks into place.
5. Connect the power supply for the XCU to the IEC connector at the rear.

Chapter 5

XCU menu reference

5.1 Video menu

Menu item	Settings	Default	Level	Stored	Description
Colour Bar					
Colour Bar	Off, On	Off	User 1	—	Turns color bar on or off (when camera signal is not present)
Bar Type	Split, Full	Split	User 1	Cradle	Selects color bar type.
SD Detail					
Detail	Off, On	Off	User 1	XCU	Turns SD Detail on or off
Source	R, G, Y, R+G	Y	User 1	XCU	Selects the source for SD Detail signal generation.
Level	0..99	25	User 1	XCU	Sets overall SD Detail level: amount of detail added to the SD video signal.
Vertical Lvl	0..99	50	User 1	XCU	Sets the level of the vertical component in the SD Detail signal.
Noise Slicer	0..99	10	User 1	XCU	Sets the level of the Noise Slicer.
Coarse/Fine	0..99	90	User 1	XCU	Sets SD Detail balance between coarse and fine structures (0 = coarse, 99 = fine).
Level Dependence	0..99	30	User 1	XCU	Sets the SD Detail reduction level for shadow areas.
Soft Detail	Off, On	Off	User 1	XCU	Switches SD Soft Detail on or off. This function reduces the amount of detail added fo large transitions.
Soft Detail Lvl	0..99	50	User 1	XCU	Sets the maximum limit level of detail for Soft Detail.

5.2 Monitoring menu

Menu item	Settings	Default	Level	Stored	Description
Display	On, Time	Time	User 2	XCU	Selects the camera menu to be permanently On or to disappear after a set Time.
Menu time	3..30	10	User 3	XCU	Sets the length of time the menu is dis-played when the Display mode is set to Time.
Statusbar					
Camera Number	Off, On	Off	User 1	—	Switch on to show the camera number in the status bar.
Name	Off, Alias, Dev ID	Off	User 1	—	Switch on and select system Alias or device ID to show in the status bar.
Cable Info	Off, On	Off	User 1	—	Switch on to show transmission cable information in the status bar.

5.3 Audio/Intercom menu

Menu item	Settings	Default	Level	Stored	Description
Audio					
Audio 1 Level	0dB, 6dB	6dB	User 1	—	Selects studio audio attenuation level for Audio input 1.
Audio 2 Level	0dB, 6dB	6dB	User 1	—	Selects studio audio attenuation level for Audio input 2
Intercom					
Isolate					
Isolate	Isolate, System	System	User 1	Cradle	Isolate = Isolate Program and Production intercom from camera head; System = isolate is off
Eng					
Wire Mode	4wire, 2wire	4wire	User 1	Cradle	Selects wiring mode for Engineering intercom channel.
Volt/Cur drive	4wire, 2wire	4wire	Service	—	Selects voltage of current drive mode for Engineering intercom channel.
2/4 wire	4wire, 2wire	4wire	Service	—	
Level	0dB, 6dB	6dB	User 1	XCU	Selects intercom channel attenuation.
Side Tone	0..99	50	User 1	Cradle	Sets side tone (feedback) volume level.
Prod					
Wire Mode	4wire, 2wire	4wire	User 1	Cradle	Selects wiring mode for Production intercom channel.
Volt/Cur drive	4wire, 2wire	4wire	Service	—	Selects voltage of current drive mode for Production intercom channel.
2/4 wire	4wire, 2wire	4wire	Service	—	
Level	0dB, 6dB	6dB	User 1	XCU	Selects intercom channel attenuation.

Menu item		Settings	Default	Level	Stored	Description
	Side Tone	0..99	50	User 1	Cradle	Sets side tone (feedback) volume level.
Prog						
	Wire Mode	4wire, 2wire	4wire	User 1	Cradle	Selects wiring mode for Program intercom channel.
	Level	0dB, 6dB	6dB	User 1	XCU	Selects intercom channel attenuation.

5.4 Install menu

Menu item		Settings	Default	Level	Stored	Description
Camera Number		1..99	1	User 2	Cradle	Sets camera number.
Alias		<text>	—	User 2	XCU	Sets Alias for the camera system.
Device ID		<text>	—	User 2	Cradle	Sets Device ID for the XCU.
Timing						
	H Phase	0..99	50	User 0	Cradle	Sets the horizontal (H) synchronization phase.
	Shift					
	Pixels	0..1920	0	Service	Cradle	Selects output time shift for all video outputs in pixels.
	Lines	0..1080	0	Service	Cradle	Selects output time shift for all video outputs in video lines.
Time/Date						
	Time	<Time>		User 2	—	Shows current time.
	Date	<Date>		User 2	—	Shows current date.
	Change Time					
	Hours (24h)	0..23	0	User 2	—	Sets the value for hours.
	Minutes	0..59	0	User 2	—	Sets the value for minutes.
	Set time	Exec, ..		User 2	—	Apply new time settings.
	Change Date					
	Day	1..31	1	User 2	—	Sets the value for day.
	Month	1..12	1	User 2	—	Sets the value for month.
	Year	2000...2199	2012	User 2	—	Sets the value for year.
	Set date	Exec, ..		User 2	—	Apply new date settings.
	Status	NotSet, DataLoss, Error, Ok	Ok	User 2	—	Shows the time/date setting status.
	Batt. Status	Ok, Low, Error	Ok	User 2	—	Show Battery Status. When low, have the internal battery replaced.
Signalling input						
	Onair Source	GPIO, Ethernet	GPIO	User 0	Cradle	GPIO (General Purpose Input/Output): On Air is controlled by the signalling connector on the XCU; Ethernet: On Air is controlled via the C2IP (Ethernet) network, e.g. by the OCP 400.

Menu item		Settings	Default	Level	Stored	Description
	Onair R Inp.	Low/High, High/Low, Open/High, High/Open	Low/High	User 0	Cradle	Selects switch mode for the Red On Air signalling input.
	Onair Y Inp.	Low/High, High/Low, Open/High, High/Open	Low/High	User 0	Cradle	Selects switch mode for the Yellow On Air (ISO) signalling input.
	Call Input	Low/High, High/Low, Open/High, High/Open	Low/High	User 0	Cradle	Selects switch mode for the Call signalling input.
Signalling Outp.						
	Crash2Air	On, Off	Off	User 1	XCU	
Network						
	IP mode	Auto, Manual	Auto	User 0	—	Selects manual or automatic IP configuration mode.
	Subnet Mask	0..31	0	User 0	—	Selects the subnet mask value (when manual IP mode is selected).
	BS IP digit 1	1..250	0	User 0	Cradle	Selects XCU IP address (when IP mode is manual).
	BS IP digit 2	0..255	0	User 0	Cradle	
	BS IP digit 3	0..255	0	User 0	Cradle	
	BS IP digit 4	1..254	0	User 0	Cradle	
	CAM IP digit 1	1..250	0	User 0	Cradle	Selects camera head IP address (when IP mode is manual).
	CAM IP digit 2	0..255	0	User 0	Cradle	
	CAM IP digit 3	0..255	0	User 0	Cradle	
	CAM IP digit4	1..254	0	User 0	Cradle	
	Apply IP settings	Exec, ...	Exec	User 0	—	Select Exec to apply the new IP settings.
AFD						
	Insert	On. Off	Off	Service	XCU	Turns AFD (Active Format Description) embedding in video signal on or off.
	Setting	16:9 (Full), 4:3 (Center)	16:9 (Full)	User 3	—	Selects the type of AFD (Active Format Description) code to be embedded in the video signal.
Extern Video						
	Aspect Ratio	16:9, 4:3	16:9	User 3	Cradle	
No Signal		Col.Bar, Black	Col.Bar	User 3	—	
Video Mode		1080i50 ...	—	User 3	XCU	Selects a video mode for the XCU test signal when no camera is connected.
3G Output		Level A, Level B	Level A	User 3	XCU	Selects SMPTE 425M Level-A or Level-B mapping to be used for the 3G video outputs.
HD-SDI Out D		HD, SD	HD	User 3	XCU	Selects video output signal (HD or SD) on video connector D.
SD AspectRatio		16:9, 4:3	16:9	User 3	—	
SD LetterBox		Off, 16:9	Off	User 3	—	
HDSDI LensData		Off, On	Off	Service	Cradle	

5.5 Security menu

Menu item	Settings	Default	Level	File	Description
Installed level	User0 .. User3	User 0	User 0	—	Selects XCU user level. Note: switch the unit off and on to take the changes into effect.
PIN Code	<code>	—	User 2	—	Enter a PIN code to access Service level
Factory Defaults	Exec, ...	Exec	User 2	—	Resets all settings to their factory defaults.

5.6 Diagnostics menu

Menu item	Settings	Default	Level	Stored	Description
Cable Power					
Camera Power	On, Off	On	User 2	—	<Advanced settings>
Connector	None, Fiber, Triax, Error	None	User 2		<Advanced settings>
Status	Unknown, Open, Power Off, Overload, Short, Cam Off, Cam On, Error	Unknown	User 2	—	<Advanced settings>
Int.Error	Unknown, VMtest, STtest, CStest, FBtest, Start, Shutdown, nonFlex, Family	Unknown	User 2	—	<Advanced settings>
Communication					
Cam Connected	Yes, No	No	User 2	—	<Advanced settings>
C2IP Panels	0..99	0	User 2	—	<Advanced settings>
LDK Connect Gw	Yes, No	No	User 2	—	<Advanced settings>
Ethernet					
MAC-Address	<####>	—	User 2	Cradle	<Advanced settings>
Link state	Connected, Disconn	Disconn	User 2	—	<Advanced settings>
Link type	Unknown, 10Mb/ Half, 10Mb/Full, 100Mb/Half, 100Mb/Full, Negotiate	Unknown	User 2	—	<Advanced settings>
Loopback test					
Loopback test	Off, On	Off	Service	—	<Advanced settings>
Data count	<####>		Service	—	<Advanced settings>
Data errors	0..65535	0	Service	—	<Advanced settings>
Data loss	0..65535	0	Service	—	<Advanced settings>
Transmission					

Menu item	Settings	Default	Level	Stored	Description
Transm. path	T2F Conv, F2T Conv, 3GTriax, 3GFiber, Unknown, None	None	User 0	—	<Advanced settings>
Transm. select					
Priority	Auto, Triax, Fiber	Auto	User 0	—	<Advanced settings>
Transmission	Triax, Fiber	Triax	User 0	—	<Advanced settings>
Transm. profile					
Selection Mode	Auto, Manual	Auto	Service	XCU	<Advanced settings>
Profile	3G Optimal, HD Optimal, 3G Robot, HD Robot	3G Optimal	Service	XCU	<Advanced settings>
Triax					
Cable Length	<####>	—	User 0	—	<Advanced settings>
Cable Status	OK, Critic, Error, NoSig, Unknown	NoSig	User 0	—	<Advanced settings>
Rx Sig.Status	OK, Critic, Error, NoSig, Unknown	NoSig	User 0	—	<Advanced settings>
Tx Sig.Status	OK, Critic, Error, NoSig, Unknown	NoSig	User 0	—	<Advanced settings>
Fiber					
Fib A (CAM->XCU)					
Cable Status	OK, Critic, Error, NoSig, Unknown	NoSig	User 0	—	<Advanced settings>
Signal Status	OK, Critic, Error, NoSig, Unknown	NoSig	User 0	—	<Advanced settings>
RX Margin	—	—	User 0	—	<Advanced settings>
CRC Error Count	0..65535	50	Service	—	<Advanced settings>
Fib B (XCU->CAM)					
Cable Status	OK, Critic, Error, NoSig, Unknown	NoSig	User 0	—	<Advanced settings>
Signal Status	OK, Critic, Error, NoSig, Unknown	NoSig	User 0	—	<Advanced settings>
RX Margin	—	—	User 0	—	<Advanced settings>
CRC Error Count	0..65535	50	Service	—	<Advanced settings>
T2F Converter (Triax to Fiber Converter)					
Temperature	Ok, Unknown, Critic, Error	Unknown	User 0	—	<Advanced settings>
FPGA Temp	<temp>	—	Service	—	<Advanced settings>
Fan	—	—	User 0	—	<Advanced settings>
Cable Power	Unknown, Open, Power Off, Overload, Short, Cam Off, Cam On, Error	Error	User 0	—	<Advanced settings>

Menu item	Settings	Default	Level	Stored	Description
Int.Error	Unknown, VMtest, STtest, CStest, FBtest, Start, Shutdown, nonFlex, Family	Unknown	User 0	—	<Advanced settings>
Package	Ok. Not Ok	Not Ok	User 0		<Advanced settings>
Package 12NC	0..65535	0	User 0		<Advanced settings>
Package Version	0..65535	0	User 0		<Advanced settings>
F2T Converter (Fiber to Triax Converter)					
Temperature	Ok, Unknown, Critic, Error	Unknown	User 0	—	<Advanced settings>
FPGA Temp	<temp>	—	Service	—	<Advanced settings>
Package	Ok. Not Ok	Not Ok	User 0		<Advanced settings>
Package 12NC	0..65535	0	User 0		<Advanced settings>
Package Version	0..65535	0	User 0		<Advanced settings>
Transm. Details					
Triax					
Triax Locked	Yes, No	No	Service	—	<Advanced settings>
->XCU					
Cable Length	0..65535	135	Service	—	<Advanced settings>
Total Quality	0..65535	255	Service	—	<Advanced settings>
Cable Quality	Good, Average, Bad, Undef	Undef	Service	—	<Advanced settings>
Signal Quality	Good, Average, Bad, Undef	Undef	Service	—	<Advanced settings>
Avg MER	Good, Average, Bad, Undef	Undef	Service	—	<Advanced settings>
Max MER	Good, Average, Bad, Undef	Undef	Service	—	<Advanced settings>
EQ Taps	Good, Average, Bad, Undef	Undef	Service	—	<Advanced settings>
RS Error	Good, Average, Bad, Undef	Undef	Service	—	<Advanced settings>
Filter MER	Good, Average, Bad, Undef	Undef	Service	—	<Advanced settings>
<-XCU					
Cable Length	0..65535	0	Service	—	<Advanced settings>
Total Quality	0..65535	255	Service	—	<Advanced settings>
Cable Quality	Good, Average, Bad, Undef	Undef	Service	—	<Advanced settings>
Signal Quality	Good, Average, Bad, Undef	Undef	Service	—	<Advanced settings>
->Conv					
Cable Length	0..65535	135	Service	—	<Advanced settings>
Total Quality	0..65535	255	Service	—	<Advanced settings>

Menu item		Settings	Default	Level	Stored	Description
	Cable Quality	Good, Average, Bad, Undef	Undef	Service	—	<Advanced settings>
	Signal Quality	Good, Average, Bad, Undef	Undef	Service	—	<Advanced settings>
	Avg MER	Good, Average, Bad, Undef	Undef	Service	—	<Advanced settings>
	Max MER	Good, Average, Bad, Undef	Undef	Service	—	<Advanced settings>
	EQ Taps	Good, Average, Bad, Undef	Undef	Service	—	<Advanced settings>
	RS Error	Good, Average, Bad, Undef	Undef	Service	—	<Advanced settings>
	Filter MER	Good, Average, Bad, Undef	Undef	Service	—	<Advanced settings>
<-Conv						
	Cable Length	0..65535	0	Service	—	<Advanced settings>
	Total Quality	0..65535	255	Service	—	<Advanced settings>
	Cable Quality	Good, Average, Bad, Undef	Undef	Service	—	<Advanced settings>
	Signal Quality	Good, Average, Bad, Undef	Undef	Service	—	<Advanced settings>
Fiber						
Fiber Locked		Yes, No	No	Service	—	<Advanced settings>
Fiber Locked		Yes, No	No	Service	—	<Advanced settings>
-> XCU						
	RX Margin	—	—	Service	—	<Advanced settings>
	CRC Error Count	0..65535	50	Service	—	<Advanced settings>
<- XCU						
	RX Margin	—	—	Service	—	<Advanced settings>
	CRC Error Count	0..65535	50	Service	—	<Advanced settings>
-> CAM						
	RX Margin	—	—	Service	—	<Advanced settings>
	CRC Error Count	0..65535	50	Service	—	<Advanced settings>
<- CAM						
	RX Margin	—	—	Service	—	<Advanced settings>
	CRC Error Count	0..65535	50	Service	—	<Advanced settings>
SFP Module						
	Opt. Module	Unknown, FTLF1424P2	Unknown	Service	—	<Advanced settings>
	RX Power	—	—	Service	—	<Advanced settings>
	RX Power	—	—	Service	—	<Advanced settings>
	TX Power	—	—	Service	—	<Advanced settings>

Menu item	Settings	Default	Level	Stored	Description
TX Power	—	—	Service	—	<Advanced settings>
Audio mute	Off, On	On	Service	—	<Advanced settings>
Video mute	Off, On	On	Service	—	<Advanced settings>
Data Error Stats					
UART Errors	0..65335	0	Service	—	<Advanced settings>
Decompr Errors	0..65335	0	Service	—	<Advanced settings>
IP Errors	0..65335	0	Service	—	<Advanced settings>
TCP Errors	0..65335	0	Service	—	<Advanced settings>
TCP Retries	0..65335	0	Service	—	<Advanced settings>
Reset Statistics	Off, On	Off	Service	—	<Advanced settings>
Temperature					
Fan					
Actual	—	—	User 0	—	<Advanced settings>
Required	—	—	User 0	—	<Advanced settings>
Temp (C)					
Power	—	—	User 0	—	<Advanced settings>
Generic FPGA0	—	—	User 0	—	<Advanced settings>
Generic FPGA1	—	—	User 0	—	<Advanced settings>
Transm FPGA	—	—	User 0	—	<Advanced settings>
SFP Module	—	—	User 0	—	<Advanced settings>
Temp (F)					
Power	—	—	User 0	—	<Advanced settings>
Generic FPGA0	—	—	User 0	—	<Advanced settings>
Generic FPGA1	—	—	User 0	—	<Advanced settings>
Transm FPGA	—	—	User 0	—	<Advanced settings>
SFP Module	—	—	User 0	—	<Advanced settings>
Video inputs					
Extern 1					
Carrier	Yes, No	No	User 1	—	<Advanced settings>
Locked	Yes, No	No	User 1	—	<Advanced settings>
VideoMode	Unknown, SD, 1080i59, 1080i50, 720p59, 720p50, 1080p59, 1080p50, 1080i47	Unknown	User 1	—	<Advanced settings>
Extern 2					
Carrier	Yes, No	No	User 1	—	<Advanced settings>
Locked	Yes, No	No	User 1	—	<Advanced settings>
VideoMode	Unknown, SD, 1080i59, 1080i50, 720p59, 720p50, 1080p59, 1080p50, 1080i47	Unknown	User 1	—	<Advanced settings>
Extern 3					

Menu item	Settings	Default	Level	Stored	Description
Carrier	Yes, No	No	User 1	—	<Advanced settings>
Locked	Yes, No	No	User 1	—	<Advanced settings>
VideoMode	Unknown, SD, 1080i59, 1080i50, 720p59, 720p50, 1080p59, 1080p50, 1080i47	Unknown	User 1	—	<Advanced settings>
Teleprompter	Unknown, None, PAL, NTSC	Unknown	User 0	—	<Advanced settings>
Reference In	Unknown, 1080i59, 1080i50, 720p59, 720p50, 1080p59, 1080p50, 1080i48, PAL, NTSC	Unknown	User 0	—	<Advanced settings>
Gen Lock	Yes, No	No	User 0	—	<Advanced settings>
XCU Type	Unknown, <range of XCU Types>	Unknown	User 2	—	<Advanced settings>
XCU Status	Unknown, Ok, Illegal	Unknown	User 2	—	<Advanced settings>
XCU PID	<####>	—	User 2	—	<Advanced settings>
Package Info					
Package	Ok, Not Ok	Ok	User 2	—	<Advanced settings>
Package 12NC	0..65535	0	User 2	—	<Advanced settings>
Package Version	0..65535	0	User 2	—	<Advanced settings>
Component	Appl SW, GEB FW, GEB Nios, TRB FW, PFB SW, Config SW, Bootloader	Appl SW	User 2	—	<Advanced settings>
Valid	Ok, Not Ok, N/A	Not Ok	User 2	—	<Advanced settings>
12NC	0..65535	0	User 2	—	<Advanced settings>
Version	0..65535	0	User 2	—	<Advanced settings>
PCB Info					
Board	GEB, UIB, COB, IDB, TRB, PDB, PFB	GEB	User 2	—	<Advanced settings>
PID	—	—	User 2	—	<Advanced settings>
12NC	0..65535	0	User 2	—	<Advanced settings>
Status	0..255	0	User 2	—	<Advanced settings>
Metrics					
Metrics	??, NoAccess, Recovered, Init, Valid	??	User 2	—	<Advanced settings>
Run Hours	0..65535	0	User 2	—	<Advanced settings>
Total Run Hours	0..65535	0	User 2	—	<Advanced settings>
Power Cycles	0..65535	0	User 2	—	<Advanced settings>
Minimum Temp	—	—	User 2	—	<Advanced settings>
Maximum Temp	—	—	User 2	—	<Advanced settings>

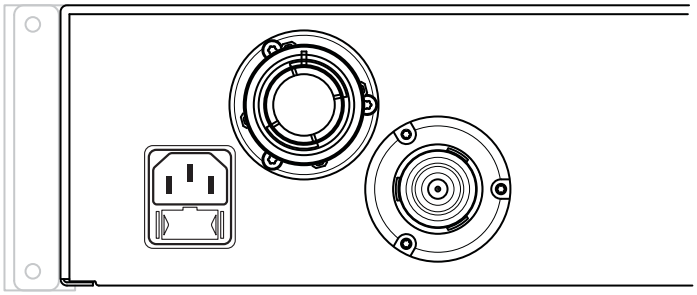
5.7 Service menu

Menu item	Settings	Default	Level	File	Description
Info Files					
Storage	None, SDcard, USB, SD+USB	None	Service	—	<Advanced settings>
Write Config	Exec, ...	—	Service	—	<Advanced settings>
Write Settings	Exec, ...	—	Service	—	<Advanced settings>
Write Usage	Exec, ...	—	Service	—	<Advanced settings>
LogFiles					
Storage	None, SDcard, USB, SD+USB	None	Service	—	<Advanced settings>
Write AppLog	Exec, ...	—	Service	—	<Advanced settings>
SD Card					
Present	Yes, No	No	Service	—	<Advanced settings>
Status	Unknown, Busy..., OK, Error, NonGV, Init...	Unknown	Service	—	<Advanced settings>
Copy to USB	Exec, ..	—	Service	—	<Advanced settings>
Data Partition					
Status	Unknown, Busy..., OK, Error, NonGV, Init...	Unknown	Service	—	<Advanced settings>
Space Left	<value>	—	Service	—	<Advanced settings>
Format	Off, Running	Off	Service	—	<Advanced settings>
Lic. Partition					
Status	Unknown, Busy..., OK, Error, NonGV, Init...	Unknown	Service	—	<Advanced settings>
USB available	No, Yes	No	Service	—	<Advanced settings>

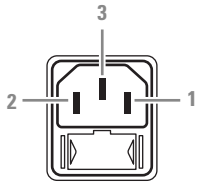
Chapter 6

Connectors and signals

6.1 XCU back panel



6.1.1 Mains power connector



IEC style 3-pin male

Pin	Description
1	Neutral
2	Line
3	Earth

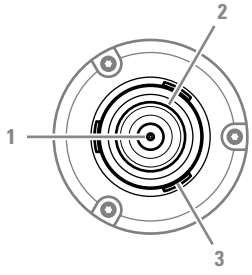
Mains input voltage:
100 to 240 VAC (auto-sensing)

Fuses (2x):
T8AH / 250 VAC

Mains frequency:
50 to 60 Hz (auto-sensing)

Power consumption:
450 W max.

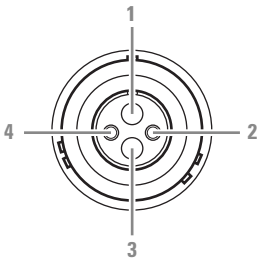
6.1.2 Triax connector



Pin	Description
1	Inner pin: signals + power
2	Inner shield: return
3	Outer shield: housing

Various types of Triax connector are available by request.

6.1.3 Hybrid fiber connector

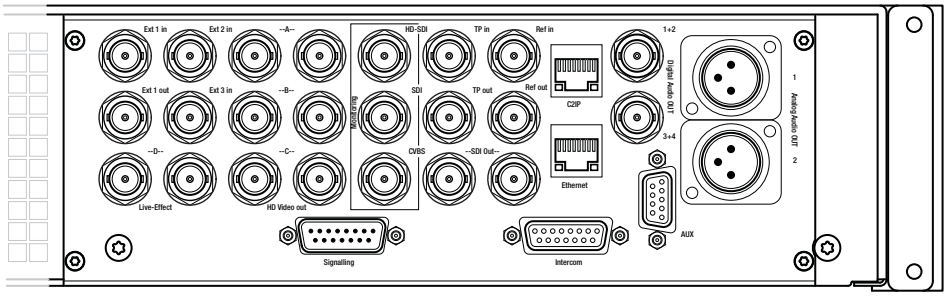


Pin	Description
1	Optic fiber channel A
2	Power supply return
3	Optic fiber channel B
4	Power supply

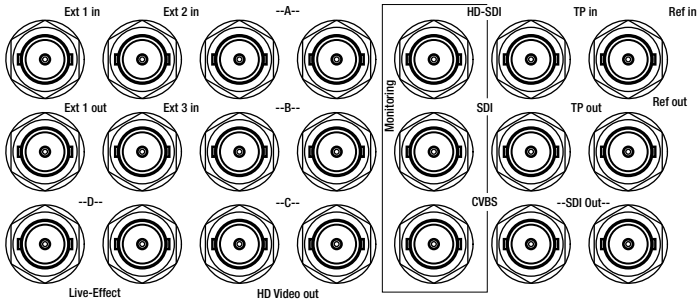
LEMO Hybrid Fiber connector compliant with SMPTE 304M.

Various types of hybrid fiber connector are available by request

6.2 Cradle back panel



6.2.1 Main video connector panel



6.2.2 External video input connectors

Connector	Signal
Ext 1-in	External 1 HD-SDI or SDI video input
Ext 1-out	External 1 HD-SDI or SDI loop-through signal
Ext 2-in	External 2 HD-SDI or SDI video input
Ext 3-in	External 3 HD-SDI or SDI video input

☞ Note

Make sure that the applied external video inputs match the temporal frequency (50/59.94 Hz) of the selected camera video mode and that they are synced with the camera output signal.

External video signals

The video signals applied on the external video inputs are returned to the camera. Apply the external video signal according to the following table:

Selected camera video mode	External video input (Ext1, 2 or 3)	Output on the camera adapter
1080p50/59	576i50 or 480i59.94	1080i50/59
	1080p50/59	1080i50/59
	720p50/59	no signal
	1080i50/59	no signal
720p50/59	576i50 or 480i59.94	1080i50/59
	1080p50/59	no signal
	720p50/59	720p50/59
	1080i50/59	no signal
1080i50/59	576i50 or 480i59.94	1080i50/59
	1080p50/59	no signal
	720p50/59	no signal
	1080i50/59	1080i50/59

6.2.3 Main (HD Video) output connectors

Connector	Signal or function
HD-SDI **A** (2x), **B** (2x), **C** (2x)	6x BNC, 0.8 Vpp, 75 Ω, SMPTE 292M (1.5 Gbit/s) with embedded audio In 1080p50/59.94 mode: 6x BNC, 0.8 Vpp, 75 Ω, SMPTE 425M (Level A or B), (3 Gbit/s) with embedded audio.
HD-SDI **D** / Live/Effect (2x)	2x BNC, 0.8 Vpp, 75 Ω, SMPTE 292M (1.5 Gbit/s) with embedded audio (1080i or 720p modes only) or SMPTE 259M (270 Mbit/s) (switchable)

6.2.4 SDI Out video connectors

Connector	Signal or function
SD-SDI-1	BNC, 0.8 Vpp, 75 Ω, SMPTE 259M (270 Mbit/s)
SD-SDI-2	BNC, 0.8 Vpp, 75 Ω, SMPTE 259M (270 Mbit/s)

6.2.5 Monitoring connectors

Connector	Signal
HD-SDI	Digital HD-SDI output signal with menu text and indicators inserted.
SDI	Digital SDI output signal with menu text and indicators inserted.
CVBS	CVBS (analog SD) output signal with menu text and indicators inserted.

6.2.6 Teleprompter connectors

Connector	Signal
TP in	Teleprompter input signal (analog SD)
TP out	Teleprompter loop-through* (output) signal

*) This output signal is always looped-through even when the XCU is not mounted.

6.2.7 Reference connectors

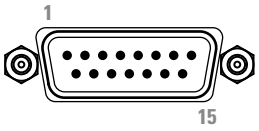
Connector	Signal
Ref in	Reference input signal (HD Tri-Level sync or SD Black Burst are accepted)
Ref out	Reference loop-through*) (output) signal

*) This output signal is always looped-through even when the XCU is not mounted.

Note

The last loop-through output in a chain must be terminated with a 75 Ω resistor. The maximum number of XCUs that can be looped through is 6.

6.2.8 Signalling connector



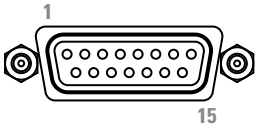
SubD 15-pin male connector

Pin	Description
1	Preview output ext. (relay contact < 10 Ω)
2	Call output ext. (relay contact < 10 Ω)
3	ISO input ext. (dry contact)
4	On Air input ext. (dry contact)
5	Call input ext. (dry contact)
6	Audio 1 level (analog input voltage from 0 to 5 V)
7	5 V (Operating Control Panel)

Pin	Description
8	Housing
9	Preview output ext. return
10	Call output ext. return
11	ISO input ext. return
12	On Air input ext. return
13	Call input ext. return
14	Audio 2 level (analog input voltage from 0 to 5 V)
15	GND

Microphone impedance >200 Ω; sensitivity range: -70 to -28 dBm
Signal at pin 2 of audio input is in phase with signal at pin 2 of the audio output.
Shield of cable to the pin marked housing.

6.2.9 Intercom connector



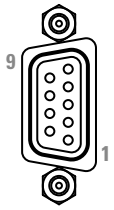
SubD 15-pin female connector

Pin	Description
1	Prod out (4-wire out, 2-wire in/out)
2	Prod in (4-wire only)
3	Prod in shield (4-wire only)
4	Eng in (4-wire only)
5	Eng out (4-wire out, 2-wire in/out)
6	Prog in (4-wire only)
7	Prog in shield (4-wire only)
8	Housing

Pin	Description
9	Prod out return (4-wire out, 2-wire in/out)
10	Prod in return (4-wire only)
11	Eng in shield (4-wire only)
12	Eng in return (4-wire only)
13	Eng out return (4-wire out, 2-wire in/out)
14	Prog in return (4-wire only)
15	Housing

Shield of cable to the pin marked housing.

6.2.10 Auxiliary (AUX) connector



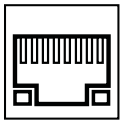
SubD 9-pin female connector

Pin	Description
1	5 V
2	no connection
3	Private data out
4	Private data in
5	Housing (attach cable shield to this pin)

Pin	Description
6	GND
7	no connection
8	Private data out return
9	Private data in return

Shield of cable directly to the connector housing.

6.2.11 C2IP connector (top)

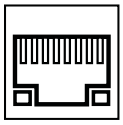


8-pin standard RJ-45 ethernet connector

Pin	Description
1	Transmit data + (TX+)
2	Transmit data - (TX-)
3	Receive data+ (RX+)
4	no connection
5	no connection
6	Receive data - (RX-)
7	no connection
8	no connection

Ethernet 10Base-T, 100Base-TX compliant with IEEE-802.3 (edition 2000)

6.2.12 Ethernet connector (bottom)



8-pin standard RJ-45 ethernet connector

Pin	Description
1	Transmit data + (TX+)
2	Transmit data - (TX-)
3	Receive data+ (RX+)
4	TD2+
5	TD2-
6	Receive data - (RX-)
7	TD3+
8	TD3-

Ethernet 10Base-T, 100Base-TX, 1000BASE-T and Gigabit Ethernet compatible.

6.2.13 Digital Audio OUT 1+2 connector

BNC connector

BNC connector, 2-channel AES/EBU compliant audio output, 1.0 Vpp, 75 Ω

This connector carries the digitally converted audio channel 1 and 2 from the camera's Mic 1 and Mic 2 connectors.

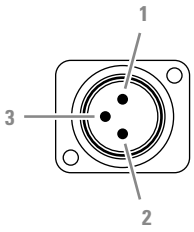
6.2.14 Digital Audio OUT 3+4 connector

BNC connector

BNC connector, 2-channel AES/EBU compliant audio output, 1.0 Vpp, 75 Ω

This connector carries digital audio channel 3 and 4 from the camera's VF connector (when AES In is selected by the VF connector signal selection switch on the adapter).

6.2.15 Analog Audio OUT 1 connector



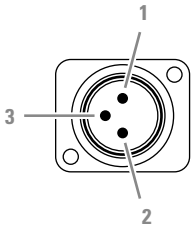
XLR 3-pin male connector

Pin	Description
1	Audio shield
2	Audio output
3	Audio return

Sensitivity range: -64 dBu to -22 dBu

Signal at pin 2 of audio output is in phase with signal at pin 2 of audio input.

6.2.16 Analog Audio OUT 2 connector



XLR 3-pin male connector

Pin	Description
1	Audio shield
2	Audio output
3	Audio return

Sensitivity range: -64 dBu to -22 dBu

Signal at pin 2 of audio output is in phase with signal at pin 2 of audio input.

Chapter 7

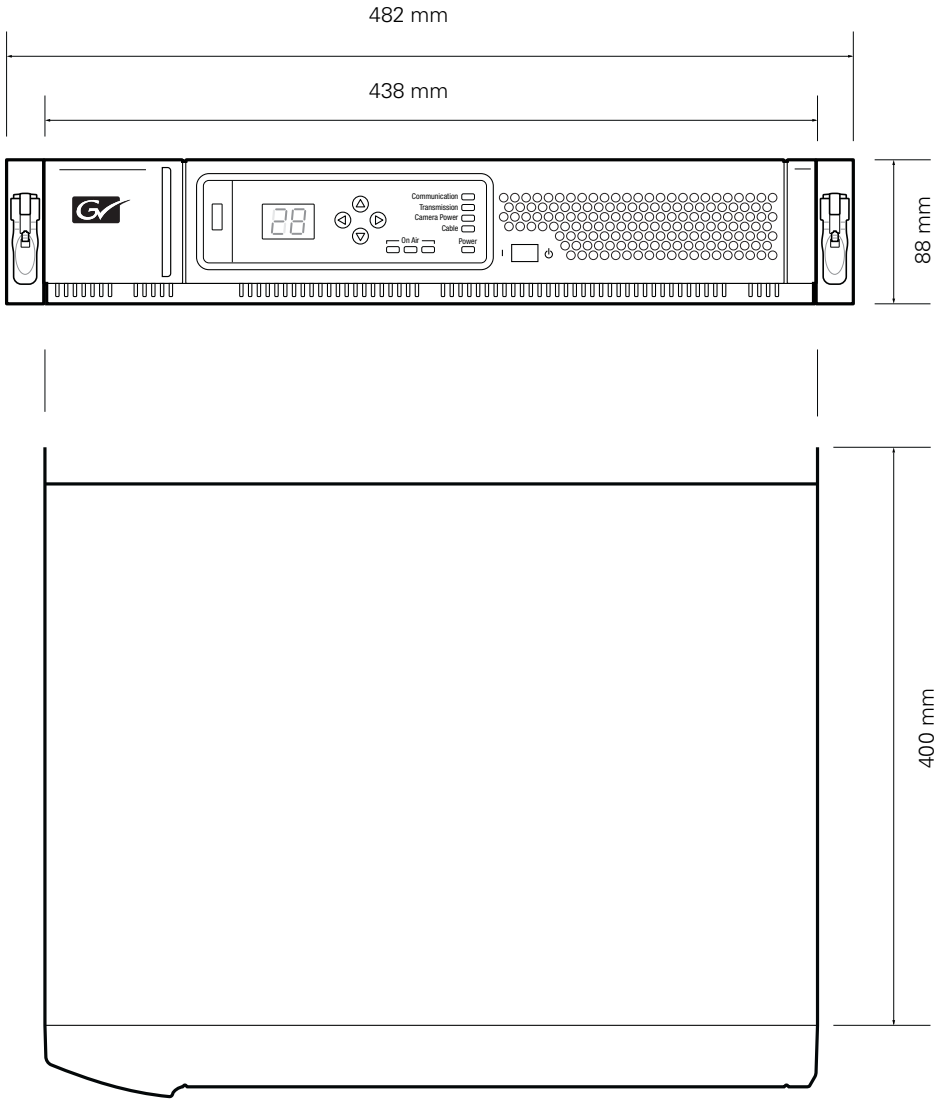
Specifications

7.1 Technical specifications

Item	Value
General	
Dimensions (W x H x D)	438 x 88 x 400 mm (17.2 x 3.5 x 15.7 in) excluding transmission connector
Weight (max.)	13.5 kg (29.8 lbs)
Operating temperatures	0 to +45 °C (+32 to +113 °F)
Storage temperatures	-25 to +70 °C (-13 to +158 °F)
Operating humidity	max. 90% relative humidity (non condensing)
Shock resistance	max. 10 G (transport)
	max. 2 G (operating)
Altitude	max. 15,420 m (50,000 ft)
Power	
Power requirements	100 to 240 VAC, 50 to 60 Hz
Power consumption	450 W max. fully equipped
Power connection	IEC type, 3-pin male
Transmission	
Transmission connector(s)	Depending on XCU transmission
Video and signal connectors	
Teleprompter input	1x BNC (+ loop-through output), 1.0 Vpp, 75 Ω
Reference input	1x BNC (+ loop-through output), 1.0 Vpp, 75 Ω, HD Tri-Level sync or SD Black Burst
HD-SDI outputs (with embedded digital audio)	6x BNC, 0.8 Vpp, 75 Ω, SMPTE 292M, 1080i/720p at 59.94/50 Hz; 1080p23.98/25/29.97 Hz or
HD-SDI outputs (live/effect)	2x BNC, 0.8 Vpp, 75 Ω, SMPTE 292M, 1080i/720p at 59.94/50 Hz; 1080p23.98/25/29.97 Hz
HD-SDI monitoring output	1x BNC, 0.8 Vpp, 75 Ω, SMPTE 292M, 1080i/720p at 59.94/50 Hz; 1080p23.98/25/29.97 Hz
SDI monitoring output	1x BNC, 1.0 Vpp, 75 Ω

Item	Value
CVBS monitoring output	1x BNC, 0.8 Vpp, 75 Ω
External video inputs	3x BNC, 0.8 Vpp, 75 Ω, HD-SDI or SDI + 1x loop through output
Data connectors	
C2IP camera control	Standard Ethernet RJ-45 connector, 100 Mb
Ethernet	Standard Ethernet RJ-45 connector, 1 Gb
Signalling in/out	D-sub 15-pin, male; preview, green tally (Call), dry contact; yellow tally (ISO), dry contact; red tally (On Air), dry contact; remote audio level control (-22 to -64 dBu), DC
Auxiliary in/out	D-sub 9-pin, female; private data in/out, 115 kbits/s TTL-levels (RS-232)
Analog audio outputs	
Analog audio outputs	2x XLR-3, 0/+6 dBu (±1.5 dB, max. 18 dBu, 600 Ω, max. gain 70 dB)
Frequency response	40 Hz to 15 kHz, (+1/-3 dB, 1 kHz, -10 dBu output level)
Distortion	less than 0.5% (100 Hz / 1 kHz, +6 dBu output level, 600 Ω)
S/N ratio	58 dB (unweighted RMS)
Digital audio outputs	
Audio channel 1+2	2x BNC, digital audio AES/EBU compliant, 48 kHz/24 bits, 1.0 Vpp, 75 Ω
Audio channel 3+4	2x BNC, digital audio AES/EBU compliant, 48 kHz/24 bits, 1.0 Vpp, 75 Ω
Intercom	
Intercom in/out	D-sub 15-pin, female (Prog in, Prod in/out, Eng in/out)
Input	0 or 6 dBu (max. 6dBu or 12 dBu), 9 kΩ
Output	0 or 6 dBu (±2 dB, max 12 dBu), 600 Ω
Frequency response	150 Hz to 6 kHz (1 kHz, -10 dBu output level)
Distortion	less than 2% (1 kHz, +12 dBu output level)

7.2 Dimensions



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